AMENDMENT TO THE CLAIMS

1. (Currently amended) A method for reconditioning a lithium ion battery having reduced capacity, comprising the steps of:

providing a lithium ion battery from a lithium battery family, the battery including a negative electrode, a positive electrode, a nonconductive separator disposed between the negative electrode and the positive electrode, and a source of lithium and an electrolytic solution hermetically sealed in a container, and further including a negative terminal connected to the negative electrode and a positive terminal connected to the positive electrode extending through a face of the container to provide external connections;

determining the voltage discharge profile for the lithium battery family to determine a characteristic voltage below a normal discharge voltage for which operation will result in a gradual loss of battery cell capacity leading to an inoperative cell, and selecting a voltage below the normal discharge voltage and above the characteristic voltage, wherein the selected voltage is sufficiently high so as not to damage a battery cell of the battery;

slowly discharging the lithium ion battery to ~~a predetermined voltage sufficiently high so as not to damage the battery cells and~~ the selected voltage at a discharge rate sufficiently low to redistribute lithium ions in the negative electrode while substantially completely discharging the battery; [[then]]

providing a power source;

connecting the power source to the negative terminal and the positive terminal of the battery;

providing power to the battery from the power source to recharge the lithium ion battery so as to substantially uniformly redistribute the lithium ions in the positive electrode;

wherein the capacity of the battery is substantially restored

2. (Currently amended) A method for reconditioning a lithium ion battery having reduced capacity, comprising the steps of:

providing a power source;

providing a lithium ion battery from a lithium battery family, the battery including a negative electrode, a positive electrode, a nonconductive separator disposed between the negative electrode and the positive electrode, and a source of lithium and an electrolytic solution hermetically sealed in a container, and further including a negative terminal connected to the negative electrode and a positive terminal connected to the positive electrode extending through a face of the container to provide external connections;

determining the voltage discharge profile for the lithium battery family to determine a characteristic voltage below a normal discharge voltage for which operation will result in a gradual loss of battery cell capacity leading to an inoperative cell, and selecting a voltage below the normal discharge voltage and above the characteristic voltage, wherein the selected voltage is sufficiently high so as not to damage a battery cell of the battery;

connecting the power source to the negative terminal and the positive terminal of the battery;

slowly discharging the lithium ion battery to a ~~predetermined voltage sufficiently high so as not to damage the battery cells and~~ the selected voltage at a discharge rate sufficiently low to redistribute lithium at the negative electrode while substantially completely discharging the battery; and

providing power to the battery from the power source to recharge the lithium ion battery so as to substantially uniformly redistribute the lithium in the positive electrode;

wherein the capacity of the battery is substantially restored.

3. (Original) The method of claim 2 wherein the step of providing a lithium ion battery includes providing a metal oxide-based positive electrode.

4. (Original) The method of claim 3 wherein the step of providing a metal oxide-based positive electrode includes providing a nickel oxide-based positive electrode.

5. (Original) The method of claim 4 wherein the step of slowly discharging the battery includes slowly discharging the battery at a voltage above at least about 1.6 volts.

6. (Original) The method of claim 3 wherein the step of providing a metal oxide-based positive electrode includes providing a cobalt oxide-based positive electrode.

7. (Original) The method of claim 6 wherein the step of slowly discharging the battery includes slowly discharging the battery at a voltage above at least about 0.5 volts.

8. (Original) The method of claim 2 wherein the step of providing a lithium ion battery includes providing a carbonaceous negative electrode.

9. (Original) The method of claim 2 wherein the step of providing a lithium ion battery includes providing a battery having an electrolytic solution comprising $LiPF_6$, phosphor hexachloride and organic carbonate.

10. (Original) The method of claim 2 wherein the step of slowly discharging the lithium ion battery further includes the step of reducing the capacity of the battery in stages to a capacity value of C/n to the predetermined voltage, where C is the rated capacity of the battery.

11. (Original) The method of claim 10 wherein the step of reducing the capacity of the battery is performed in a plurality of stages.

12. (Original) The method of claim 11 wherein the plurality of stages is performed at a predetermined temperature, a number of stages in the plurality of stages required to fully discharge the battery dependent on the predetermined temperature and materials comprising the lithium ion battery provided.

13. (Original) The method of claim 10 wherein the negative electrode includes a negative current collector, wherein the step of slowly discharging the lithium ion battery includes discharging the battery to a voltage sufficiently high so as to prevent dissolving the negative current collector.

14. (Currently amended) A method for reconditioning a lithium ion battery having reduced capacity, comprising the steps of:

providing a power source;

providing a lithium ion battery <u>from a battery family, the battery</u> including a carbonaceous negative electrode having a current collector, a nickel oxide-based positive electrode having a current collector, a nonconductive separator disposed between the negative electrode and the positive electrode, and a source of lithium and

an electrolytic solution hermetically sealed in a container, and further including a negative terminal connected to the negative electrode and a positive terminal connected to the positive electrode extending through a face of the container to provide external connections;

determining the voltage discharge profile for the lithium battery family to determine a characteristic voltage below a normal discharge voltage for which operation will result in a gradual loss of battery cell capacity leading to an inoperative cell, and selecting a voltage below the normal discharge voltage and above the characteristic voltage, wherein the selected voltage is sufficiently high so as not to damage a battery cell of the battery;

connecting the power source to the negative terminal and the positive terminal of the battery;

slowly discharging the lithium ion battery to ~~a predetermined voltage limit sufficiently high so as not to damage the battery cells and~~ the selected voltage at a discharge rate sufficiently low to redistribute lithium ions at the negative electrode while substantially completely discharging the battery; and

providing power to the battery from the power source to recharge the lithium ion battery so as to uniformly redistribute the lithium ions in the positive electrode;

wherein the capacity of the battery is restored.

15. (Original) The method of claim 14 wherein the step of providing a lithium ion battery includes providing a battery having an electrolytic solution comprising $LiPF_6$, phosphor hexachloride and organic carbonate.

16. (Original) The method of claim 14 wherein the step of slowly discharging the lithium ion battery further includes the step of reducing the capacity of the battery in stages to C/n until the predetermined voltage limit is reached.

17. (Original) The method of claim 16 wherein the step of reducing the capacity of the battery is performed by discharging the battery in a plurality of stages.

18. (Original) The method of claim 17 wherein the plurality of stages is performed at a predetermined temperature, a number of stages in the plurality of stages required to substantially fully discharge the battery dependent on the predetermined temperature.

19. (Currently amended) The method of claim 18 wherein the battery is fully discharged at the predetermined temperature of about 20° C at a capacity of ~~C/8096~~ C/8192, where C is the rated capacity of the battery.

20. (Original) The method of claim 18 wherein the battery is fully discharged at the predetermined temperature of about 40° C. at a capacity of about C/1024 where C is the rated capacity of the battery.

21. (Original) The method of claim 14 wherein the predetermined voltage is in the range of about 2.0 volts to about 2.7 volts.

22. (Original) The method of claim 17 wherein the battery is discharged in each stage to a value of C/n, where n is a value of about 2^x, and x corresponds to the stage, up to a thirteenth stage wherein the battery is fully discharged.

23. (Currently amended) A reconditioned ~~battery~~ lithium ion battery comprising:

a carbonaceous negative electrode having a current collector;

a metal oxide-based positive electrode having a surface and that includes a current collector;

a nonconductive separator disposed between the negative electrode and the positive electrode;

a source of lithium;

and an electrolytic solution hermetically sealed in a container;

the battery further including a negative terminal connected to the negative electrode and a positive terminal connected to the positive electrode extending through a face of the container to provide external connections; and

wherein the reconditioned battery is characterized by a substantially uniform distribution of lithium over the surface of the positive electrode after substantially fully discharging the battery followed by recharging the battery.